# Course Description and Syllabus

## MAT 102 Data Structures

### Spring 2003

**Instructor**
Mike McLendon

**Office**
Goldstein 213; Office hours TTh 2:00-3:00, W 2:30-3:30, and by appointment
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**Texts**
1. *Data Abstraction and Problem Solving with C++ 3/e*, Carrano and Prichard
2. *Absolute C++*, Savitch (or another good book on C++)

**Course Website**
http://albert.washcoll.edu/~mmclendon2/MAT102/
Here you will find exercises, projects, answers to frequently asked questions, links to C++ websites, and *The Linux Users’ Guide*, among other things.

**Prerequisites**
You must take MAT 201 (Differential Calculus), and MAT 101 (Introduction to Programming) before this class. You should be familiar with programming in an object oriented style using either Java or C++. If you have not taken the two courses above, see me.

**Outline**
1. This course introduces the design and analysis of algorithms as well as techniques to organize blocks of data for efficient access by algorithms. You will learn the C++ language using the development tools available under the GNU/Linux operating system, principles of software engineering, the Unified Modeling Language (UML) and program specification, and the Standard Template Library (STL) and aspects of object-oriented programming.
2. By the end of this course you will be able to take a task specification given in plain English and develop an efficient computer solution involving choices of the algorithm and the underlying data structures. By the middle of this course you will have developed a signature programming style.
3. This course is required for all CS majors and minors and it counts towards distribution.

**Grading**
Your grade will be based on the average of 5-6 programming projects (50%), homework (5%), two midterm exams (25%), and a comprehensive final exam (20%). In addition, you must have passing grades on the final and on the average of the two midterms in order to pass the course.

**Attendance Policy**
Attendance will not be taken, but you are expected to attend all classes. This course is very challenging and you will have a difficult time making up any work that you miss. You are responsible for any announcements, changes to the syllabus, etc., that may occur during your absence. You will not be given project extensions except under the most urgent circumstances.
ACADEMIC HONESTY

Except when otherwise specified, all work submitted for a grade should be your own. This means that it is the product of your knowledge and problem solving skills. For some projects, you will be required to work as a team. In those cases, you are expected to make a substantial contribution to the efforts of the team in order to receive credit for the team project.

You are expected to abide by the Washington College Honor Code. If you copy someone else’s work or give your work to others, you could be subject to disciplinary action.

PREPARATION FOR CLASS

Class time will be used to explain the main concepts. You will have to read the text and practice problems on your own. The text has several “self-test exercises” at the end of each chapter. You should use these exercises to check your reading comprehension even if they are not specifically assigned. The solutions to the self-test exercises are in the back of the book.

This class is very time consuming. Depending on your learning rate, you might have to spend more than the normal ten hours per week that is expected in a course at Washington College.
The following is an approximate schedule for the course.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>READING</th>
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| 1    | Principles of Software Engineering, C++ Basics | C&P, Chap 1  
Sav, Chaps 1-3, 20 |
| 2    | C++ issues: Arrays and Pointers, Functions, Overloading | C&P, Chap 3  
Sav, Chaps 3-5, 10 |
| 3    | Data Abstraction and Class Design, UML, STL | C&P, Chap 3  
Sav, Chaps 6-9, 19 |
| 4    | Data Abstraction and Class Design        | Sav, Chaps 14-16               |
| 5    | Linked Lists, Midterm Exam #1            | C&P, Chap 4  
Sav, Chap 17 |
| 6    | Linked Lists, continued                  | C&P, Chap 4  
Sav, Chap 17 |
| 7    | Recursion, Stacks                        | C&P, Chaps 2, 5, 6  
Sav, Chap 13 |
| 8    | Spring Break, March 10-14                |                                |
| 9    | Stacks                                   | C&P, Chap 6                    |
| 10   | Queues                                   | C&P, Chap 7                    |
| 11   | Efficiency and Sorting, Midterm Exam #2  | C&P, Chaps 8, 9                |
| 12   | Trees and Graphs                         | C&P, Chaps 10, 13              |
| 13   | Trees and Graphs, continued              | C&P, Chaps 10, 13              |
| 14   | Tables and Priority Queues               | C&P, Chap 11                   |
| 15   | Selected Advanced Topics                 | TBA                            |